PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 8820

, "Front Matter: Volume 8820," Proc. SPIE 8820, Nanoepitaxy: Materials and Devices V, 882001 (25 September 2013); doi: 10.1117/12.2033974

Event: SPIE NanoScience + Engineering, 2013, San Diego, California, United States

PROCEEDINGS OF SPIE

Nanoepitaxy: Materials and Devices V

Nobuhiko P. Kobayashi
A. Alec Talin
Albert V. Davydov
M. Saif Islam
Editors

25–27 August 2013
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 8820

Proceedings of SPIE 0277-786X, V. 8820

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Nanoepitaxy: Materials and Devices V, edited by Nobuhiko P. Kobayashi, A. Alec Talin,
Albert V. Davydov, M. Saif Islam, Proc. of SPIE Vol. 8820, 882001 · © 2013 SPIE
CCC code: 0277-786X/13/\$18 · doi: 10.1117/12.2033974

Proc. of SPIE Vol. 8820 882001-1

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Nanoepitaxy: Materials and Devices V*, edited by Nobuhiko P. Kobayashi, A. Alec Talin, Albert V. Davydov, M. Saif Islam, Proceedings of SPIE Vol. 8820 (SPIE, Bellingham, WA, 2013) Article CID Number.

ISSN: 0277-786X

ISBN: 9780819496706

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445

SPIE.org

Copyright © 2013, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/13/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID Number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID Number.

Contents

vii Conference Committee

LOW-DIMENSIONAL MATERIALS AND DEVICES I

- 8820 02 **Fabrication of ambipolar gate-all-around field-effect transistors using silicon nanobridge arrays** [8820-1]
J. Y. Oh, Univ. of California, Davis (United States); J.-T. Park, Univ. of Incheon (Korea, Republic of); M. S. Islam, Univ. of California, Davis (United States)
- 8820 04 **Electronic effects of defects in one-dimensional channels (Invited Paper)** [8820-3]
E. J. Fuller, D. Pan, B. L. Corso, O. T. Gul, P. G. Collins, Univ. of California, Irvine (United States)

1D OPTOELECTRONIC DEVICES

- 8820 0A **Nanowires for next generation photovoltaics (Invited Paper)** [8820-9]
R. R. LaPierre, McMaster Univ. (Canada)

1D MATERIALS I

- 8820 0I **Vapor-liquid-solid growth of <110> silicon nanowire arrays (Invited Paper)** [8820-17]
S. M. Eichfeld, M. F. Hainey Jr., H. Shen, C. E. Kendrick, E. A. Fucinato, The Pennsylvania State Univ. (United States); J. Yim, M. R. Black, Bandgap Engineering, Inc. (United States); J. M. Redwing, The Pennsylvania State Univ. (United States)

1D MATERIALS II

- 8820 0L **Aluminum oxide coating for post-growth photo emission wavelength tuning of indium phosphide nanowire networks** [8820-20]
D. M. Fryauf, J. Zhang, K. J. Norris, J. Diaz Leon, N. P. Kobayashi, Univ. of California, Santa Cruz (United States)
- 8820 0M **Orientation, alignment, and polytype control in epitaxial growth of SiC nanowires for electronics application in harsh environments (Invited Paper)** [8820-21]
Y. Koshka, R. V. K. G. Thirumalai, B. K. Krishnan, Mississippi State Univ. (United States); I. Levin, National Institute of Standards and Technology (United States); J. N. Merrett, Air Force Research Lab. (United States); A. V. Davydov, National Institute of Standards and Technology (United States)

LOW-DIMENSIONAL MATERIALS AND DEVICES II

- 8820 0Q **Two-step growth and fabrication of thermoelectric devices employing indium phosphide nanowire networks** [8820-25]
K. J. Norris, J. Zhang, D. M. Fryauf, N. P. Kobayashi, Univ. of California, Santa Cruz (United States)

NANOSCALE HYBRID INORGANIC/ORGANIC MATERIALS AND DEVICES

- 8820 0S **Ultrasensitive biomolecular assays with amplifying nanowire FET biosensors (Invited Paper)** [8820-27]
C. O. Chui, K.-S. Shin, Y. Mao, Univ. of California, Los Angeles (United States)
- 8820 0T **Using tobacco mosaic virus template for the fabrication of three-dimensional hierarchical microbattery electrodes with high energy and high power density (Invited Paper)** [8820-28]
E. Pomerantseva, K. Gerasopoulos, M. Gnerlich, P. Odenwald, J. Culver, R. Ghodssi, Univ. of Maryland, College Park (United States)

LOW-DIMENSIONAL GROWTH AND DEPOSITION

- 8820 0V **Difference in formation of ferromagnetic MnAs nanoclusters on III-V semiconducting nanowire templates (Invited Paper)** [8820-30]
S. Hara, H. Fujimagari, S. Sakita, M. Yatago, Hokkaido Univ. (Japan)

ATOMICALLY CONTROLLED GROWTH AND DEPOSITION

- 8820 0Y **Moisture barrier and chemical corrosion protection of silver-based telescope mirrors using aluminum oxide films by plasma-enhanced atomic layer deposition** [8820-33]
D. M. Fryauf, Univ. of California, Santa Cruz (United States); A. C. Phillips, Univ. of California Observatories (United States); N. P. Kobayashi, Univ. of California, Santa Cruz (United States)
- 8820 0Z **Wide band antireflection coatings deposited by atomic layer deposition (Invited Paper)** [8820-34]
A. D. Jewell, J. Hennessy, M. E. Hoenk, S. Nikzad, Jet Propulsion Lab. (United States)

1D MATERIALS III

- 8820 12 **Study of Raman signal from indium phosphide nanowire networks coated with gold** [8820-37]
J. Zhang, D. M. Fryauf, K. J. Norris, J. J. Diaz Leon, N. P. Kobayashi, Univ. of California, Santa Cruz (United States)

- 8820 13 **Single-polycrystalline core-shell silicon nanowires grown on copper** [8820-38]
K. J. Norris, J. Zhang, D. M. Fryauf, Univ. of California, Santa Cruz (United States);
E. Coleman, G. S. Tompa, Structured Materials Industries, Inc. (United States);
N. P. Kobayashi, Univ. of California, Santa Cruz (United States)

Author Index

Conference Committee

Symposium Chairs

Satoshi Kawata, Osaka University (Japan)
Manijeh Razeghi, Northwestern University (United States)

Symposium Cochairs

David L. Andrews, University of East Anglia Norwich (United Kingdom)
James G. Grote, Air Force Research Laboratory (United States)

Conference Chairs

Nobuhiko P. Kobayashi, University of California, Santa Cruz (United States)
A. Alec Talin, National Institute of Standards and Technology (United States)
Albert V. Davydov, National Institute of Standards and Technology (United States)
M. Saif Islam, University of California, Davis (United States)

Conference Program Committee

Kristine A. Bertness, National Institute of Standards and Technology (United States)
Necmi Biyikli, Virginia Commonwealth University (United States)
Shadi A. Dayeh, Los Alamos National Laboratory (United States)
Supratik Guha, IBM Thomas J. Watson Research Center (United States)
Jung Han, Yale University (United States)
Muhammad M. Hussain, King Abdullah University of Science and Technology (Saudi Arabia)
Chennupati Jagadish, The Australian National University (Australia)
Francois Leonard, Sandia National Laboratories, California (United States)
Samuel S. Mao, Lawrence Berkeley National Laboratory (United States)
Tariq Manzur, Naval Undersea Warfare Center (United States)
Nezih Pala, Florida International University (United States)
Samuel Tom Picraux, Los Alamos National Laboratory (United States)
S. M. Prokes, U.S. Naval Research Laboratory (United States)
Zhifeng Ren, Boston College (United States)
Atsuhito Sawabe, Aoyama Gakuin University (Japan)
Loucas Tsakalakos, GE Global Research (United States)
Emanuel Tutuc, The University of Texas at Austin (United States)
Lionel Vayssieres, Xi'an Jiaotong University (China)
George T. Wang, Sandia National Laboratories (United States)

Session Chairs

- 1 Low-Dimensional Materials and Devices I
Nobuhiko P. Kobayashi, University of California, Santa Cruz (United States)
- 2 2D Electron Devices
M. Saif Islam, University of California, Davis (United States)
- 3 1D Optoelectronic Devices
A. Alec Talin, National Institute of Standards and Technology (United States)
- 4 2D Materials
Silvija Gradecak, Massachusetts Institute of Technology (United States)
- 5 1D Materials I
Erin Cleveland, U.S. Naval Research Laboratory (United States)
- 6 1D Materials II
Joan M. Redwing, The Pennsylvania State University (United States)
- 7 Low-Dimensional Materials and Devices II
Andrew J. Lohn, Sandia National Laboratories (United States)
- 8 Nanoscale Hybrid Inorganic/Organic Materials and Devices
April D. Jewell, Jet Propulsion Laboratory (United States)
- 9 Low-Dimensional Growth and Deposition
Ekaterina Pomerantseva, University of Maryland, College Park (United States)
- 10 Atomically Controlled Growth and Deposition
Seth Bank, The University of Texas at Austin (United States)
- 11 1D Materials III
Nobuhiko P. Kobayashi, University of California, Santa Cruz (United States)